

1 | INTRODUCTION

WATER SYSTEM OWNERSHIP AND MANAGEMENT

The City of Kent (City) is a municipal corporation that owns and operates a public water system that covers the majority of its corporate boundaries and some areas outside the City's corporate boundaries. Water system data on file at the Washington State Department of Health (DOH) for the City's system is shown in [Table 1-1](#).

Table 1-1
Water System Ownership Information

Information Type	Description
System Type	Group A - Community - Public Water System
System Name	Kent Water Department
County	King
DOH System ID Number	381501
Owner Number	002950
Address	220 4th Avenue S, Kent, WA 98032
Contact	Mr. Sean Bauer, Water System Manager
Contact Phone Number	(253) 856-5610

OVERVIEW OF EXISTING SYSTEM

In 2016, the City provided water service to an average of approximately 14,907 customer connections, or 44,854 equivalent residential units (ERUs), within the City's water service area. The City limits comprise an area of approximately 34.4 square miles, and the existing retail water service area is approximately 23.7 square miles. The 2016 population served by the water system was approximately 68,157, whereas the population residing in the City limits was approximately 124,500. Other areas within the City limits are within the water service areas of the City of Renton, Highline Water District, Soos Creek Water and Sewer District, and Lake Meridian Water District.

The City's water supply is currently provided by 16 wells, 2 springs, and an intertie connection with the City of Tacoma (Tacoma). All City sources are chlorinated and fluoridated. The 208th Street/212th Street Wellfield is also treated for manganese, iron, and hydrogen sulfide removal. Water from the 208th Street/212th Street Wellfield, Armstrong Springs Wells, Clark Springs, East Hill Well, Kent Springs, Seven Oaks Well, and the Tacoma intertie are treated for pH adjustment. Water from the Tacoma intertie also receives filtration and ozone treatment in Tacoma's system. The City is a partner with Tacoma, Lakehaven Water and Sewer District, and Covington Water District on the Second Supply Pipeline source. Water storage is provided by 9 reservoirs that have a total capacity of approximately 24.9 million gallons (MG). In addition, the City's water system has 13 pressure zones, with 18 pressure reducing stations. The system

also has 6 booster pump stations and approximately 284 miles of water main. A summary of the 2016 water system data is shown in [Table 1-2](#).

Table 1-2
2016 Water System Data

Description	Data
Water Service Population	68,157
Water Service Area	23.7 square miles
Total Connections	14,907
Total ERUs	44,854
Demand per ERU	172 gallons per day
Average Day Demand	5,348 gpm
Distribution System Leakage	6.0%
Maximum Day/Average Day Demand Factor	2.17
Peak Hour/Maximum Day Demand Factor	1.46
Number of Pressure Zones	13
Number of Wells	16
Number of Spring Sources	2
Total Capacity of City Sources	16,623 gpm
Tacoma Intertie Capacity	8,778 gpm
Number of Pump Stations and Total Capacity	6 (15,505 gpm)
Number of Reservoirs and Total Capacity	9 (24.9 MG)
Number of Pressure Reducing Stations	18
Total Length of Water Main	284 miles

AUTHORIZATION AND PURPOSE

The City authorized RH2 Engineering, Inc., (RH2) to prepare this Water System Plan (WSP) as required by state law under Washington Administrative Code (WAC) 246-290-100. In accordance with WAC 246-290-100, the WSP shall be updated and submitted to DOH every 10 years. This WSP has been written to meet 10-year planning requirements. The previous WSP was prepared for the City in 2011. The purpose of this updated WSP is as follows:

- To evaluate existing water demand data and project future water demands;
- To analyze the existing water system to determine if it meets minimum requirements mandated by DOH and the City's own policies and design criteria;
- To identify water system improvements that resolve existing system deficiencies and accommodate the system's future needs for at least 20 years into the future;
- To prepare a schedule of improvements that meets the goals of the City's financial program;

- To document the City's existing water rights, their current status, and future requirements;
- To evaluate past water quality and identify water quality improvements, as necessary;
- To document the City's operations and maintenance program;
- To prepare water use efficiency, cross-connection control, wellhead protection, and water quality monitoring plans; and
- To comply with all other WSP requirements of DOH.

SUMMARY OF WSP CONTENTS

A brief summary of the content of the chapters in the WSP is as follows.

- The **Executive Summary** provides a brief summary of the key elements of this WSP.
- **Chapter 1** introduces the reader to the City's water system, the objectives of the WSP, and its organization.
- **Chapter 2** presents the water service area, describes the existing water system, and identifies adjacent water purveyors.
- **Chapter 3** presents related plans, land use, and population characteristics.
- **Chapter 4** identifies existing water demands and projected future demands.
- **Chapter 5** presents the City's operational policies and design criteria.
- **Chapter 6** discusses the City's water source, water rights, and water quality monitoring.
- **Chapter 7** discusses the water system analyses and existing system deficiencies.
- **Chapter 8** discusses the City's operations and maintenance program.
- **Chapter 9** presents the proposed water system improvements, and their estimated costs and implementation schedule.
- **Chapter 10** summarizes the financial status of the water system and presents a plan for funding the water system improvements.
- The **Appendices** contain additional information and plans that supplement the main chapters of the WSP.

DEFINITION OF TERMS

The following terms are used throughout this WSP.

Capital Facilities Charge: A one-time fee paid by a property owner when connecting to the City's water system. This fee pays for a new customer's equitable share of the cost of the existing system. This fee offsets the costs of providing water to new customers and recognizes that the existing water system was largely built and paid for by the existing customers.

Consumption: The true volume of water used by the water system's customers. The volume is measured at each customer's connection to the distribution system.

Connection Charge: A one-time fee paid by a property owner when connecting to the City's system that is made up of both the Capital Facilities Charge and the Meter Installation Charge.

Cross Connection: A physical arrangement that connects a public water system, directly or indirectly, with facilities that could present the potential for contaminating the public water system.

Demand: The quantity of water required from a water supply source over a period of time to meet the needs of domestic, commercial, industrial, and public uses, and provide enough water to supply firefighting, system losses, and miscellaneous water uses. Demands are normally discussed in terms of flow rate, such as million gallons per day (MGD) or gallons per minute (gpm), and are described in terms of a volume of water delivered during a certain time period. Flow rates pertinent to the analysis and design of water systems are as follows.

- **Average Day Demand (ADD):** The total amount of water delivered to the system in a year divided by the number of days in the year.
- **Maximum Day Demand (MDD):** The maximum amount of water delivered to the system during a 24-hour time period of a given year.
- **Peak Hour Demand (PHD):** The maximum amount of water delivered to the system, excluding fire flow, during a 1-hour time period of a given year. A system's peak hour demand usually occurs during the same day as the MDD.

Distribution System Leakage (DSL): Water that is measured as going into the distribution system but not metered as going out of the system.

Equivalent Residential Units (ERUs): One ERU represents the amount of water used by one single-family residence for a specific water system. The demand of other customer classes can be expressed in terms of ERUs by dividing the demand of each of the other customer classes by the demand represented by one ERU.

Fire Flow: The rate of flow of water required during firefighting, which is usually expressed in terms of gpm.

Head: A measure of pressure or force exerted by water. Head is measured in feet and can be converted to pounds per square inch (psi) by dividing feet by 2.31.

Head Loss: Pressure reduction resulting from pipeline wall friction, bends, physical restrictions, or obstructions.

Hydraulic Elevation: The height of a free water surface above a defined datum; the height above the ground to which water in a pressure pipeline would rise in a vertical open-end pipe.

Maximum Contaminant Level (MCL): The maximum permissible level of contaminant in the water that the purveyor delivers to any public water system user, measured at the locations identified under WAC 246-290-300, Table 3.

Meter Installation Charge: The installation charge or hook-up fee that is paid by a property owner to reimburse the City for the cost incurred to make the physical connection to the water system. This cost includes both direct and indirect costs for installing the service line off the system's water main up to and including the City-owned water meter and advanced metering infrastructure (AMI) equipment.

Potable: Water suitable for human consumption.

Pressure Zone: A portion of the water system that operates from sources at a common hydraulic elevation. For example, the 240 Zone refers to the City’s lower pressure zone, which has a reservoir with an overflow elevation of 240 feet.

Purveyor: An agency, subdivision of the state, municipal corporation, firm, company, mutual or cooperative association, institution, partnership, or persons or other entity owning or operating a public water system. Purveyor also means the authorized agents of such entities.

Supply: Water that is delivered to a water system by one or more supply facilities, which may consist of supply stations, booster pump stations, springs, and wells.

Storage: Water that is “stored” in a reservoir to supplement the supply facilities of a system and provide water supply for emergency conditions. Storage is broken down into the following five components, which are defined and discussed in more detail in [Chapter 7](#): operational storage, equalizing storage, standby storage, fire flow storage, and dead storage.

LIST OF ABBREVIATIONS

The abbreviations listed in [Table 1-3](#) are used throughout this WSP.

Table 1-3
Abbreviations

Abbreviation	Description
ADD	Average Day Demand
AMI	Advanced Metering Infrastructure
AWWA	American Water Works Association
CCR	Consumer Confidence Report
CIP	Capital Improvement Program
City	City of Kent
County	King County
CWD	Covington Water District
CWSP	Coordinated Water System Plan
CWSSA	Critical Water Supply Service Area
DBP	Disinfection Byproduct
DOH	Washington State Department of Health
DSL	Distribution System Leakage
EPA	U.S. Environmental Protection Agency
ERU	Equivalent Residential Unit
fps	feet per second
GMA	Growth Management Act
gpm	gallons per minute
HWD	Highline Water District
JOA	Joint Operating Agreement
LMWD	Lake Meridian Water District
LWSD	Lakehaven Water and Sewer District
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDD	Maximum Day Demand
MG	Million Gallons
MGD	Million Gallons per Day
mg/L	milligrams per Liter
OFM	Office of Financial Management
OSHA	Occupational Safety & Health Administration
PHD	Peak Hour Demand
psi	pounds per square inch
RCW	Revised Code of Washington
SCWSD	Soos Creek Water and Sewer District
SDWA	Safe Drinking Water Act
SEPA	State Environmental Policy Act
SOC	Synthetic Organic Chemical
SWTR	Surface Water Treatment Rule
Tacoma	City of Tacoma (Tacoma Public Utilities)
THM	Trihalomethane
UGA	Urban Growth Area
USGS	United States Geological Survey
VOC	Volatile Organic Chemical
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety & Health Act
WSP	Water System Plan
WUCC	Water Utility Coordinating Committee
WUE	Water Use Efficiency